Coordinated Implementation of the *Federal Plan for High-End Computing*

In 2003, the High-End Computing Revitalization Task Force (HECRTF) was chartered under the National Science and Technology Council (NSTC) to develop a plan for undertaking and sustaining a robust Federal high-end computing program to maintain U.S. leadership in science and technology. The *Federal Plan for High-End Computing*, released in May 2004, offers a vision for a proactive Federal effort that advances high-end computing technology to address many of society's most challenging large-scale computational problems and, in doing so, strengthens the Nation's global leadership in the sciences, engineering, and technology.

The HEC IWG is implementing this Plan through the coordination of high-end computing policy, strategies, and programs across NITRD member and participating agencies. Emphasis is placed on identifying and integrating requirements, conducting joint program planning, and developing and implementing joint strategies. Coordination activities encompass fundamental and applied research and development, technology development and engineering, infrastructure and applications, demonstrations, and education and training. The coordination is carried out through monthly HEC IWG meetings, agency-sponsored workshops, technical forums, and a variety of focused multiagency activities. The following list highlights some of these multiagency activities:

High-End Computing University Research Activity (HEC-URA): Beginning in 2004, NSF, DARPA, DOE/SC, and NSA engaged in joint planning and expanded funding for university research in operating systems, languages, compilers, and libraries, and in software tools and development environments. Beginning in 2006, NSF and other agencies will expand funding for research in file systems, storage, and I/O.

DARPA High-Productivity Computing System (HPCS) Program: The DARPA HPCS Program was initiated in 2001 to develop a new generation of high-end computing systems providing leap-ahead advances in performance, robustness, and programmability. Since then, DARPA has expanded its HPCS collaboration with other agencies to now include NSA, DOE/SC, DOE/NNSA, NASA, and NSF. Starting in 2006, HPCS enters Phase III, which will involve active collaboration with these agencies through such mechanisms as funding, participation in review panels, and requirements analysis.

Leadership Systems: The *Federal Plan* advanced the concept of "leadership high-end computing systems" to offer leading-edge computing facilities to enable breakthrough computational science and engineering for problems important to Federal agency missions and to the Nation. Today, this concept has been implemented by DOE/SC at four of its national laboratories through its INCITE program and by NASA through its National Leadership Computing Systems (NLCS) initiative. The two agencies either are completing or have completed solicitations for leadership-class computing resources, and they plan to conduct additional solicitations on a recurring basis. Other agencies are planning similar procurements of leadership-class systems in the near future.

System Performance Assessment: One of the major challenges in guiding research, development, and procurement of high-end computing systems is to measure, compare, and assess system performance. Currently, DOE and DARPA, in collaboration with other agencies, are developing methods to measure both execution performance and ease of programming. This includes novel work in combining software engineering experiments customized to high-performance computing. In addition, OSD (HPCMPO), DOE/SC (NERSC), and NSF are sharing selected benchmarks and procurement practices in order to streamline and improve the effectiveness of high-end computing systems procurements.

These examples illustrate the collaborative efforts underway in implementing the *Federal Plan for High-End Computing*. These and other HEC activities are described in further detail in the HEC I&A and HEC R&D sections of this Supplement.